



PATENT SPECIFICATION

DRAWINGS ATTACHED

936,448

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COMPLETE SPECIFICATION

Making Perforated Adhesive Tape

We, JOHNSON & JOHNSON, a corporation organised and existing under the laws of the State of New Jersey, United States of America, of 501 George Street, New Brunswick, New Jersey, United States of America, do hereby declare the invention for which we pray that a patent may be granted to us, and the method by which it is to be performed to be particularly described in and by the following statement:—

The present invention relates to the manufacture of pervious pressure-sensitive adhesive tape.

There has long been a demand for adhesive tapes which are pervious and permit the ready passage of moisture and air. Various methods for preparing such tapes have been proposed, including pattern spreading of pressure-sensitive adhesives onto pervious fabric backings to provide intermittent areas of fabric which are not coated with the pressure-sensitive adhesive, these non-coated intermittent areas permitting the passage of moisture and air. The methods generally employed for accomplishing this are to use some form of printing whereby the desired pressure-sensitive adhesive pattern is printed onto the surface of the fabric backing. There are, however, several objections to spreading the pressure-sensitive adhesive by printing, the primary objection being that it is generally necessary to use a solvent with the pressure-sensitive adhesive in order to transfer the adhesive, by printing, to the fabric backing. It is also difficult by this process to obtain a sufficiently heavy coating of pressure-sensitive adhesive to give the desired adherence when the pressure-sensitive tape is later used.

The use of solvents for spreading pressure-sensitive adhesive films, particularly in the manufacture of surgical adhesive tapes, is generally undesirable because of the difficulty in removing the solvent later, the remaining solvent often causing irritation to a user of

the tape. Another objection to this process is the cost of using solvents which must generally be recovered in order to keep the cost of the process from being prohibitive. Because of this, pressure-sensitive adhesives, particularly when used in the manufacture of surgical tapes, are preferably spread on the fabric backing by a calender process. In the calender process, a thermoplastic pressure-sensitive adhesive mass is first calendered into a thin film of pressure-sensitive adhesive and this film then calendered onto the fabric backing.

Pervious adhesive tapes on which the adhesive has been calender spread have heretofore been prepared by punching holes through the adhesive tape. This, however, is generally an unsatisfactory process. Not only is it uneconomical because of the waste caused by the removal of adhesive and backing, but the punching also substantially weakens the backing. It was further found that the heated projections tended to pyrolyze the adhesive with resulting build-up of adhesive on the heated pins. The result is that frequent cleaning of these projections is necessary and uniform perforations are difficult to obtain over an extended period of operation.

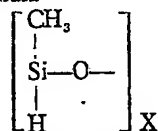
It is the object of the present invention to prepare pressure sensitive adhesive tapes having a backing in the form of a film and in which the backing has not been weakened, in which the openings through the adhesive film remain open, and which are free from flow of adhesive through the backing to the uncoated side.

In accordance with the present invention a method of making a perforated pressure-sensitive adhesive tape or sheet comprises applying a layer of pressure-sensitive adhesive to a film backing from which the adhesive is not readily removable and passing heated projections through the film and the

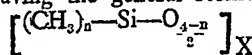
adhesive layer, the projections being coated with a release agent.

Preferably the backing is supported while the adhesive layer is applied and the projections are caused to pass through it, and the support is removed after the perforations have been so formed. The support may be conveniently provided by a roller and a carrier strip may be interposed between the backing and the roller.

A preferred release agent for the projections is a silicone type resin of the kind disclosed in our copending patent application No. 37628/59 (Serial No. 936,447). Such release agents include crosslinked methyl hydrogen substituted polysiloxane release agents of the general formula



either alone or preferably as mixtures in amounts of 2 to 98% by weight with polysiloxanes having the general formula



in which n may have values of 0, 1, 2, or 3. The methyl silicone ratio for the mixtures falls between 1.3 and 2.0.

Other release agents useful in the practise of the present invention include various silicone polymers, stearo chromic chloride Werner complexes and isopropoxy titanium stearate.

In order that the invention may be clearly understood, a preferred embodiment by way of example will now be described with reference to the accompanying drawing which is a schematic view showing the preparation of adhesive tape having a film backing and a pressure-sensitive adhesive coating.

The film backing F is removably supported on a carrier strip 23 which is passed between the nip 24 of heated rolls 25 and 26. The roll 25 is at a temperature between 180° and 320° F. and the roll 26 is at a temperature between 140° and 240° F.

The carrier strip bearing the film backing F and the pressure-sensitive adhesive coating 28 then passes, while still on the surface of the roll 26, by a heated perforating roll 29 bearing perforating projections 30 on its cylindrical surface. The projections, which preferably have a diameter of .004" to .030", may take any form depending on the type of hole desired in the tape. In the preferred practice of the invention, the projections have flat ends as it has been found that these give the cleanest perforations.

The perforating roll 29 is heated by any suitable means, such as by heated fluid or electrically, to a temperature such that the projections 30 are maintained at a temperature of between 150° and 400° F., preferably between 300° and 325° F.

The spacing of the perforating roll 29 with respect to the roll 26 is so adjusted that the distance between the ends of the projections 30 and the surface of the roll 26 is only slightly less than the thickness of the carrier strip so that only the film backing and its adhesive coating are perforated. Moreover the projections, which perforate the adhesive and backing by melting and causing the adhesive and backing film to flow out of the way of the projections are not subjected to sufficient pressure to perforate the carrier strip. During and after removal of the perforated film-backed tape from the roll 26, the carrier strip continues to support the film backing until the same has cooled to room temperature. The perforated film with adhesive may then be removed from the carrier strip or the carrier strip with the adhesive coated film rolled and stored for later processing into adhesive bandages or rewinding on removal of the carrier strip into rolls of perforate film backed tape.

By practising the present invention, uniform clean perforations through the adhesive back can be obtained. The processes applicable with any of the generally used thermoplastic pressure sensitive adhesives. Such adhesive compositions are well known in the art and described in patent and other literature, for example U.S. patent No. 2484060 and U.S. patent No. 2647843.

WHAT WE CLAIM IS:—

1. A method of making a perforated pressure-sensitive adhesive tape or sheet comprising applying a layer of pressure-sensitive adhesive to a film backing from which the adhesive is not readily removable and passing heated projections through the film and the adhesive layer, the projections being coated with a release agent.

2. A method of making a perforated pressure-sensitive adhesive tape or sheet comprising supporting a film backing on a support, applying a layer of pressure sensitive adhesive to the film backing from which the adhesive is not readily removable and passing heated projections coated with a release agent through the film and the adhesive layer while the film is so supported, and subsequently removing the support from the backing.

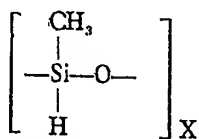
3. A method according to claim 2 in which the support comprises a roll.

4. A method according to claim 2 or 3 wherein a removable carrier strip is interposed between the backing and the support, the backing being applied to the surface of the carrier strip prior to being supported on the support and being removed from the surface of the carrier strip subsequent to removal from the support.

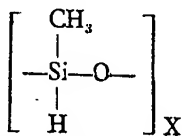
5. A method according to any of the preceding claims wherein the heated projections are formed on the cylindrical surface of a perforating roll.

6. A method according to any of the preceding claims wherein the release agent is a silicone resin.

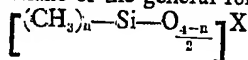
7. A method as claimed in claim 6 wherein the release agent is a cross-linked methyl hydrogen substituted polysiloxane of the general formula:



8. A method according to claim 7 wherein the release agent is a mixture of methyl hydrogen substituted polysiloxane of the general formula



and a polysiloxane of the general formula



in which n has values of 0, 1, 2 or 3, the methyl to siloxane ratio of said mixture being within the range of 1.3 to 2.0.

9. A method according to any of the preceding claims wherein the projections are maintained at a temperature of between 150° and 400° F.

10. A method according to claim 9 wherein the projections are maintained at a temperature of between 300° and 325° F.

11. A method of making a perforated pressure-sensitive adhesive tape or sheet substantially as hereinbefore described with reference to the accompanying drawing.

12. A perforated pressure-sensitive adhesive tape or sheet whenever made by a method according to any of the preceding claims.

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COMPLETE SPECIFICATION

1 SHEET

*This drawing is a reproduction of
the Original on a reduced scale*

